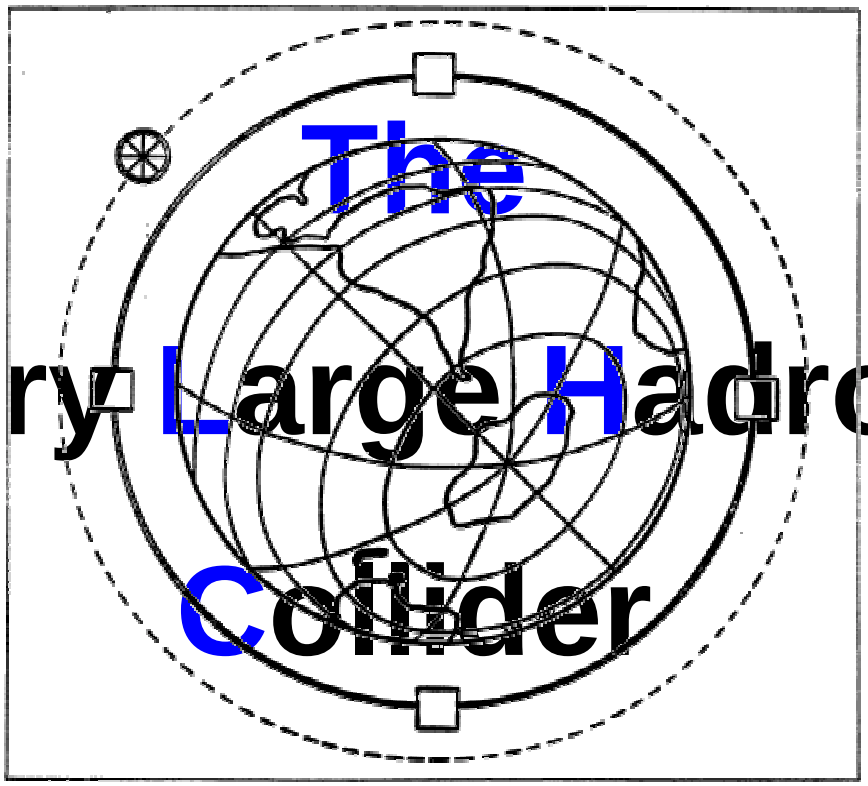


From a 1954 Slide by Enrico Fermi, University of Chicago Special Collections.

The Very Large Hadron Collider

VLHC Steering Committee Welcome

Ernest Malamud

Fermi National Accelerator Laboratory

malamud@fnal.gov

f

VLHC Magnet Technologies

May 24, 2000

ORGANIZATION OF THE NATIONAL EFFORT

Steering committee for a future very large hadron collider

From recommendations of the HEPAP Subpanel Report on "Planning for the Future of U.S. High-Energy Physics," February 1998. (Gilman Panel)

…….recommends an expanded program of R&D on cost reduction strategies, enabling technologies, and accelerator physics issues for a VLHC.

These efforts should be coordinated across laboratory and university groups with the aim of identifying design concepts for an economically and technically viable facility.

In 1998 the Steering Committee was formed in response to this recommendation.

Appointed by lab directors were:

BNL: Michael Harrison, Stephen Peggs
FNAL: Peter Limon, Ernest Malamud
LBNL: William A. Barletta, James L. Siegrist
Cornell University: Gerry Dugan
SLAC: Alex Chao

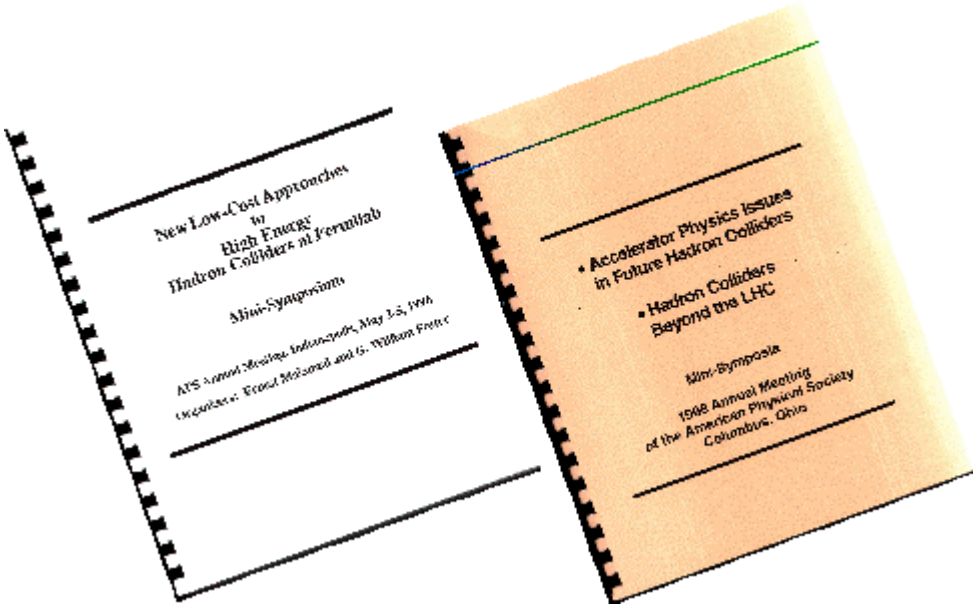
Mission Statement

The Steering committee for a future very large hadron collider coordinates efforts in the United States to achieve a superconducting proton-proton collider with approximately 100 TeV cm and approximately 10^{34} $cm^{-2}sec^{-1}$ luminosity.

References and web pages

Papers at PAC99
Proceedings of the 3-workshops: **http://vlhc.org**
Compilation of papers (Snowmass 96, Gilman Panel etc.)
http://www-ap.fnal.gov/VLHC

DPB Mini-symposia at APS Meetings



The Very Large Hadron Collider
Extending the Energy Frontier beyond the LHC

DPB Mini-Symposium,
APS2000
Long Beach Convention Center
Session J20, room 102A

2:30 - 5:30 pm, Sunday, April 30, 2000

Workshops organized by working groups.

Magnet Technologies

"Magnets for a Very Large Hadron Collider,"
Port Jefferson, LI, NY, Nov. 16-18, 1998,
Peter Wanderer, Chair

Accelerator Technologies

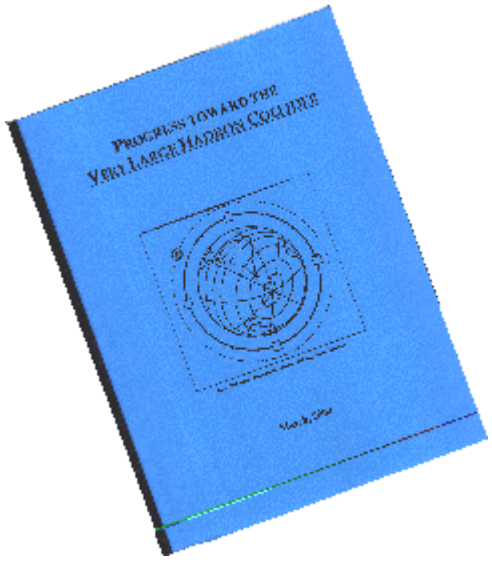
"VLHC Workshop on Accelerator Technology,"
Thomas Jefferson National Accelerator Facility,
John Marriner, Chair

Accelerator Physics

"VLHC Workshop on Accelerator Physics,"
The Abbey, Fontana, WI, Feb. 22-25, 1999
Mike Syphers, Chair

The Annual Meeting was held June 29-30, 1999 in Monterey, CA.
Hosted by LBNL. Wm. Barletta, Chair

March 2000: **1999 VLHC Annual Report** (and bibliography)



(two year progress report requested by the Gilman Panel)

This year:

Mini-Workshop: "Beam Dynamics Experiments" Feb. 22-23, 2000, BNL

"Magnets for a Very Large Hadron Collider", May 24-26, 2000, Fermilab

A select set of accelerator physics and technology problems will be studied in depth at narrowly-targeted workshops.

Mini-Workshop: "Synchrotron Radiation and Optics", Sept. '00, BNL

Mini-Workshop: "Beam Dynamics Experiments Fall", 2000, FNAL

Mini-Workshop "Characterization of the Fermilab Region Geology"

VLHC Annual Meeting October 16-18, 2000, Port Jefferson, LI, NY. Hosted by BNL

Mini-Workshop: "Collective Effects in VLHC", spring '01, SLAC

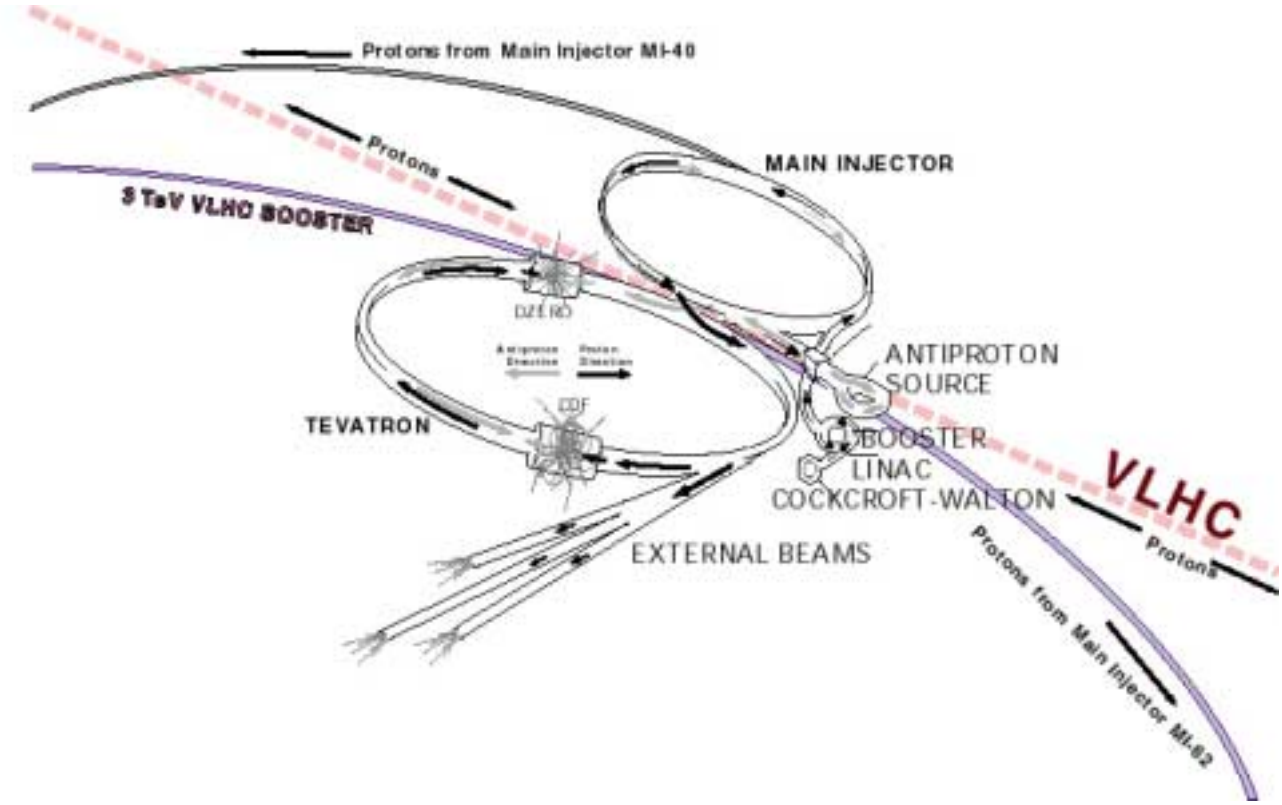
Probable: DPB Mini-symposium at April 2001 APS meeting

Snowmass 2001

STAGING SCENARIOS

The U.S. site of the vlhc is assumed to be Fermilab.

- Existence of the injector chain
- Excellent Geology



"Snowmass 2001" is a milestone to guide activities for the next year.

Focus will be on staging scenarios and parameter sets and physics potential at each stage.

Vlhc proponents will arrive at Snowmass-01 with a "set of tools," primarily new information on magnet and tunnel costs to define a variety of "staging" scenarios.

The scenarios share the common goal of achieving 100 TeV cm in pp collisions. This approach breaks down the total cost into more realistic steps with physics at each stage.

	C (km)	Magnet type	Mag Field (T)	pp E_{cm} TeV	ee E_{cm} GeV	injector	E_{inj} TeV	magnet dynamic range
Single Tunnel scenarios								
A	37.58	Trans Line	2.00	6		MI	0.15	20.0
	37.58	cos theta	11.20	28		single turn	3.00	5.0
B	120	e+e- Collider			271			
	120	Trans Line	2.00	20		Tevatron*	1.00	10.0
	120	cos theta	11.20	100		single turn	10.00	5.0
C	228	e+e- Collider			308			
	228	Trans Line	2.00	40		Tevatron*	1.00	20.0
	228	RHIC type	5.75	100		single turn	20.00	2.5
D	228	e+e- Collider			308			
	228	Trans Line	2.00	40		Tevatron*	1.00	20.0
	228	high field	12.00	200		single turn	20.00	5.0
Multiple Tunnel scenarios								
E	37.58	Trans Line	2.00	6		MI	0.15	20.0
	531	e+e- Collider			365			
	531	Trans Line	2.00	100		LF	3.00	16.6
	531	high field	12.00			single turn	50.00	
F	37.58	Trans Line	2.00	6		MI	0.15	20.0
	531	Trans Line	2.00	100		LF	3.00	16.2
	100	high field	12.50	100		"topping off"	50.00	1.0
G	37.58	Trans Line	2.00	6		MI	0.15	20.0
	228	RHIC type	5.75	100		LF	3.00	16.7
H	15	high field	11.00	12		Tevatron*	1.00	5.9
	120	high field	11.00	100		HF-site filler	12.00	4.1

CONCLUSIONS

To prepare for “Snowmass 01” work will proceed on 3 parallel (and interactive) paths --

- Physics
- Magnets
- Geology and tunnels

We are looking at cost reduction strategies that would allow the machine to be built with technology that is already understood

and at the same time

at strategies that require new technology and probably have longer time scales, and unknown cost implications.

There has been significant progress on the VLHC in the past 3 years

Innovative approaches are being proposed

R&D is underway

Proposals for future R&D are being generated